

then to a telescope. If the pressure in one copper tube were as varied, the phases of the two parts of the beam were unlike, and from the number of fringes, the refraction of the gas could be determined. The influence of pressure was examined, then the refractive power for different wave-lengths, then the influence of temperature; and the absolute refractive power deduced from the various factors obtained. The numbers for the latter range from 0.1387 (hydrogen), and 0.2706 (oxygen) to 0.7036 (sulphurous acid), and 0.8216 (cyanogen). The refraction of a gas mixture is equal to the sum of the refractions of the mixed gases. But the refraction of a compound is in general greater than that of a mixture of the simple gases composing it.

As determinations of longitude increase an ever-increasing number of control determinations are obtained. The number of the latter in Germany and Austria is now such that M. Albrecht has considered an attempt at equalisation of the system might prove advantageous, as at least an opinion might be formed regarding the degree of accuracy of the differences of longitude directly measured, and attention would be called to the weak parts of the system. He has accordingly, with M. Sadebeck, attempted an equalisation of the system of longitude determinations between the following stations:—Strassburg, Paris, Mannheim, Bonn, Leiden, Göttingen, Brocken, Leipzig, Berlin, Vienna, Munich, and Bregenz. An account of the investigation appears in *Astronomische Nachrichten*, No. 2,132. A numerical value is assigned to the various determinations, which extend over the last fifteen years; and this was necessarily, of course, somewhat arbitrary in character. In a table M. Albrecht gives for each pair of places the difference of longitude as calculated and the difference observed, and then the difference between the two. The greatest improvements are obtained in the determinations for Leipzig-Vienna and Berlin-Vienna (the difference for the former being + 0.136s., and for the latter 0.102s.) In the former case, there was some uncertainty as to the personal equation, and in the latter two weak currents had been operated with. The improvements are, of course, only approximate, and the certainty of the individual improvements obtained is considerable only when numerous control-determinations are to hand. The result sufficiently shows that a very large number of control-determinations, and an extensive establishment of the system is necessary to remove all doubt with regard to the relative position of the various stations.

As an illustration of the rapid growth of the now celebrated *Eucalyptus globulus*, we may mention that in the more elevated parts of Jamaica trees now exist about sixty feet high, the trunks of which measure a foot in diameter near the ground. These trees have been raised from seed introduced to the island about six years ago. It is proved that in the lowland districts the tree does not thrive, thus upsetting its suitability for regions in which it was at one time specially advocated.

THE new *Journal of Forestry*, the first number of which appeared on May 1, seems to have made a good start, judging from the contents of the two numbers that have now been issued. The contents are sufficiently varied to make the journal welcome to all in any way interested in forests or forest produce, both practically and scientifically, for we find not only articles on forest work for the month, but also a brief *résumé* of Mr. Thiselton Dyer's recent address on "Plant Growth" at the London Institution.

THE additions to the Zoological Society's Gardens during the past week include two Condor Vultures (*Sarcophagophaga gryphus*), a Chilean Sea Eagle (*Geranoastur melanoleucus*) from South America, presented by Mr. John T. North; two Chaus Cats (*Felis chaus*) from North Africa, presented by Capt. W. Renney; a Crested Guan (*Penelope cristata*) from South America, presented by Mr. Daniel Miron; a Green-winged Trumpeter

(*Psophia viridis*) from Brazil, a Common Trumpeter (*Psophia crepitans*), a Demeraran Cock of the Rock (*Rupicola crocea*) from Demerara, a Black-necked Stilt (*Himantopus nigricollis*), a Sun Bittern (*Eurypyga helias*), two Orinoco Geese (*Chenalopex jubata*), a Capybara (*Hydrochærus capybara*) from South America, a Moor Monkey (*Semnopithecus maurus*) from Java, purchased; six Chilean Pintails (*Dafla spinicauda*), seven Summer Ducks (*Aix sponsa*), bred in the Gardens.

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—An examination will begin on October 2 for the purpose of electing to a Physical Science Postmastership at Merton College. The postmastership is of the annual value of 80*l.* for five years, to be raised after two years, at the recommendation of the tutors, to 100*l.* The subjects of examination will be chemistry and physics; there will be a practical examination in chemistry, and candidates will have opportunities of giving evidence of a knowledge of biology. Further information from the tutor in physical science.

There will be an examination on October 11 for electing to a Natural Science Scholarship at Exeter College. The scholarship is of the annual value of 80*l.* for four years, without any limit of age. The examination will be in biology, chemistry, and physics, and candidates will be expected to show proficiency in at least two of these subjects. The examination will be to a large extent practical, but special weight will be given to a knowledge of general principles. Further information may be obtained from the Natural Science Lecturer, Prof. E. Ray Lankester.

Mr. M. J. Jackson, of University College, London, has been elected to the vacant (Holmes) Scholarship in Natural Sciences at St. John's College. The scholarship is of the annual value of 100*l.* for five years.

MANCHESTER.—Prof. Boyd Dawkins, F.R.S., has just completed his course of Field Lectures on Geology, at Owens College. Upwards of forty students—the large majority of whom were other than regular students of the College—availed themselves this year of the opportunity offered for acquiring some practical knowledge of geology. Excursions were made to the mountain limestone of Derbyshire, the coal measures near Oldham, the Permian rocks of Alderley Edge, where the copper veins disseminated throughout the sandstone were studied, and where traces of prehistoric man, in the shape of a few flint implements, were discovered. During Whit week Oxford was visited, and the Oolitic beds of the neighbourhood were explored.

During the session which has just closed, 100 students have worked in the chemical laboratories of Owens College, while the number of students attending the various courses of chemical lectures has amounted to about 200. Over a dozen original communications have proceeded from the chemical department during the session.

TAUNTON COLLEGE SCHOOL.—An address of sympathy with, and confidence in, the Rev. W. Tuckwell, head-master of the Taunton College School, is published in the local and educational papers, with the signatures of nearly all the parents. It appears that the school is heavily in debt, and that the numbers, chiefly through an attack of fever, have fallen below the paying point. The panic-stricken officials have selected the head-master as a scapegoat, attribute the loss in numbers to his "unpopularity," and are endeavouring to drive him to resign, a movement against which the parents protest in very animated terms. The part taken by this school and its head-master in working out and popularising the systematic teaching of science in company with the old-fashioned classical curriculum impels us to record these facts, and to look with interest for the result of this latest struggle between Philistinism and culture.

UNIVERSITY COLLEGE OF WALES.—A Welsh gentleman engaged in business in London, in addition to sums of 250*l.*, 2,500*l.*, and 1,000*l.* (the last sum in conjunction with his brother) previously subscribed, has just placed in the hands of the Council of the University College of Wales, a sum of money to be used in promoting scientific agriculture in Wales. According to a circular just issued, "one of the means proposed to be adopted in furtherance of this object is the delivery of courses of lectures free of charge to persons engaged in tuition in Wales, whereby they may be qualified for giving elementary instruction

in the principles of 'agriculture in their several schools." Prof. Henry Tanner, M.R.A.C., examiner for the section under the Government Department of Science will, on August 7 next, begin a course of twenty lectures, to be continued from day to day, at the College in Aberystwith.

THE UNIVERSITIES' BILL was read a third time in the House of Commons and passed on Monday, and a first time in the Upper House on Tuesday.

ADELAIDE.—We have received a copy of the *Calendar* of Adelaide University for 1877. This University has at present only four professors, who represent very fairly the main branches of literature and science. There is only one professor for Mathematics and Natural Philosophy, and the professor of Natural Science gives instruction in Chemistry, Geology, and Botany. We hope the University will soon be able to carry the principle of sub-division of labour into these two professorships, and thus promote efficient teaching, and at the same time relieve these two professors of a burden they ought not to be made to bear in this advanced age. There are some points in which our home universities might advantageously imitate that of Adelaide. Judging from the programme of the B.A. examination, the Adelaide graduates must be possessed of a more varied amount of knowledge than the ordinary graduates of our universities. Some knowledge of physical science (physics and chemistry), must be possessed by every graduate, and a choice of subjects is given in the second and third stages, whereby a candidate can take his degree either through literature or science. The University possesses a few valuable scholarships, one, of the value of 200*l.* per annum for three years, being awarded after examination in mathematics and natural science, the holder being required to proceed to England, take a degree in science at the London University, and undergo a training in engineering. We cannot but admire the lines on which education is conducted at Adelaide, and we trust the University may soon be able to extend its staff of teaching.

BERLIN.—The report of the Berlin University for the present year shows an attendance of 2,237 students, a decrease of 253 on the past year. The lectures are also attended by 2,080 other persons not connected with the University. The students are divided among the faculties as follows:—Theology, 135; law, 792; medicine, 297; philosophy (philology, history, &c.), 644; mathematics and natural sciences, 369. 194 students are from foreign countries, including nine English and thirty-nine Americans. The professors and privat-docenten number 200—fourteen in the theological, eighteen in the legal, seventy-four in the medical, and ninety-four in the philosophical faculties. The University library contains but 60,000 volumes, the royal library of 700,000 volumes being chiefly used.

UPSALA.—The *Abo Underrättelser* states that the Imperial Academy of Sciences of St. Petersburg will be represented by MM. Gadoline and Grote at the celebration of the 400th anniversary of the foundation of the University of Upsala.

### SCIENTIFIC SERIALS

*American Journal of Science and Arts*, June.—An account of the discoveries in Vermont geology of the Rev. Augustus Wing (continued), by James D. Dana.—On barite crystals from the Last Chance Mines, Morgan County, Missouri, and on Göthite from Adair County, Missouri, by G. C. Broadhead.—Estimation of chromium and aluminium in steel and iron, by Andrew A. Blair.—On the chemical composition of triphylite from Grafton, New Hampshire, by S. L. Penfield.—On a new mode of manipulating hydric sulphide, by Josiah P. Cooke, jun.—On a base derived from a waste product in the aniline manufacture, by C. Loving Jackson.—On an association of gold with Scheelite in Idaho, by B. Silliman.

*Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien*, vol. xxvi. (Parts I. and II.), 1876.—The following are the principal papers in this volume:—Synopsis Cecidomydarum, by J. v. Bergenstamm and P. Löw.—On the structure and habits of lichens, by Dr. Arthur Minks.—On the ornithological fauna of the Austro-Hungarian Empire, by A. Pelzeln (fourth paper).—Biology and characteristics of Psyllodæ, with description of two new species of the genus *Psylla*, by Dr. F. Löw.—On the flora of fungi in Hungary, by Fr. Haslinsky.—On the butterfly fauna of Surinam, by H. B. Möschler.—Mycological researches, by Schulzer von Müggenburg.—On the lichen-flora of New Zealand, by Dr. A. von Krempelhuber.

*Reale Istituto Lombardo di Scienze e Lettere, Rendiconti*, vol. x.,

fasc. viii.—On the encystment of the Proteus of Quanzati (*Amphileptus moniliger*, Ehr.), by M. Maggi.—Theory of reticular woodwork combined with an articulated system in modern American suspension bridges, by M. Clericetti.—The silk of the *Bombyx mylitta*, by M. Gabba.

THE *Fahrbuch der k. k. geologischen Reichsanstalt* (1876, vol. xxvi., Oct.-Dec.) contains the following papers:—On the ore deposits of the southern Bukowina, by B. Walter.—On the soda and Szek-soil in the Hungarian Lowlands, by E. von Kvassay.—On some green slate of the Saxon Erzgebirge, by Dr. E. Geinitz.—On the petrographical condition of the tuft-stones occurring in the Devonian formation at Graz, by Joh. Terglav.—On some rocks from the neighbourhood of Rosignano and Castellina Maritima to the south of Pisa, by Dr. Friedrich Berwerth.

### SOCIETIES AND ACADEMIES

#### LONDON

Royal Society, June 14.—“On the Minute Structure and Relationships of the Lymphatics of the Mammalian Skin, and on the Ultimate Distribution of Nerves to the Epidermis and Subepidermic Lymphatics,” by George Hoggan, M.B., and Frances Elizabeth Hoggan, M.D. Communicated by Dr. William Farr, F.R.S.

“Refractive Indices of Glass,” by J. Hopkinson, D.Sc., M.A. Communicated by Prof. G. G. Stokes, Sec. R.S.

“Electrostatic Capacity of Glass,” by J. Hopkinson, D.Sc., M.A. Communicated by Prof. Sir William Thomson, F.R.S.

“On the Difference of Potential produced by the Contact of different Substances,” by Prof. R. B. Clifton, F.R.S.

Linnean Society, June 7.—Prof. Allman, F.R.S., president, in the chair.—Dr. Maxwell Masters read an interesting paper on the “Morphology of Primroses.” Hitherto much discussion has arisen with reference to the superposition of the stamens to the petals, the free central placenta, and the nature of the ovules in the Primulaceæ. From a lengthened study and comparison of the development of the flower, minute structures, and phenomena of monstrosities, the author arrives at conclusions differing somewhat from those hitherto held. Cultivation is not the reason of the frequent structural variation, for deformed Primulaceæ in the wild state are far from uncommon; indeed the wild primrose itself is very much subject to such changes. Certain genera and species are more frequently found deformed than are others; for instance, the cowslip is less subject to change than is the primrose. Entering into all the more important variations observed by the author and recorded by others, in various parts of the flower, he sums up: (1) That the petals of most Primulaceæ are late outgrowths from the receptacular tube. (2) That the placenta is a direct prolongation of the receptacle or axis, and without apex or side connection with the carpels. (3) The placenta occasionally in monstrous flowers arises from the margin or centre of carpel, but sometimes is detached, the detached placenta cohering like a solid column. (4) Staminal and carpellary leaves may occasionally be divided or lobed. (5) The ovular coat is essentially foliar, representing blade or undivided leaf, and is not a direct production from the axis. (6) Processes of carpellary leaf may be infolded, thus forming secondary carpels.—The Rev. G. Henslow followed by a “Note on the causes of numerical increase of parts of plants.” In this he classified the various methods and causes of the increase of parts of leaves and floral whorls, more especially with the view of limiting each of the various kinds to its proper cause respectively.—The secretary briefly indicated the contents of a paper by Mr. Marcus Hartog, “On the floral development and symmetry in the order Sapotaceæ.” From the extracts read of this communication it appears the author, from observation of growing plants in Ceylon has independently arrived at and here brought forward further evidence tending to the same results propounded by the two foregoing home botanists.—“On the nymph stage of the Embidæ, with notes on the habits of the family, &c.,” was next read by the author, Mr. R. McLachlan. He stated that in 1837 Prof. Westwood (in *Trans. Linn. Soc.*) instituted the characters of *Embia*, a genus of insects allied to the white ant. Lately (therefore forty years after) Mr. Michael, of Highgate, discovered some orchids partially destroyed by an insect found to belong to the Embidæ, and subsequently the nymph form obtained fills a gap in the insect's history. Mr. McLachlan, in allusion to the habits, recorded by Mr. Lucas and others, mentioned its being carnivorous and spinning a silken web like that of a spider, which, however, Mr. McLachlan believes to be for